

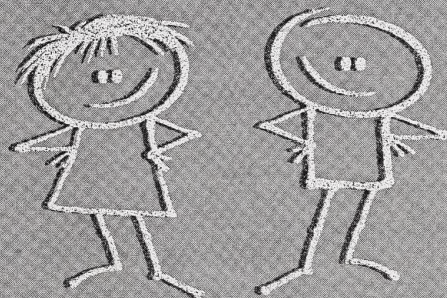
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Mathematics 4

Module 2 Number Concepts and Patterns



Assignment Booklet 2A



Learning
Technologies
Branch

Alberta
LEARNING

FOR TEACHER'S USE ONLY

Summary

Teacher's Comments

	Total Possible Marks	Your Mark
Day 1	5	
Day 2	18	
Day 3	10	
Day 4	45	
Day 5	39	
Day 6	39	
Day 7	39	
Day 8	29	
Day 9	(1) 70	
	(2) 10	
Day 10	(1) 10	
	(2) 10	
	324	

This document is intended for

Students ☒

Teachers ☒

Administrators ☐

Home Instructors ☒

General Public ☐

Other ☐

Mathematics 4
Module 2: Number Concepts and Patterns
Assignment Booklet 2A
Learning Technologies Branch
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ASSIGNMENT BOOKLET 2A

MATHEMATICS 4 – MODULE 2: NUMBER CONCEPTS AND PATTERNS

Notes to the Home Instructor

Learning Tasks

The nine mathematics modules and the accompanying Assignment Booklets have been developed so that students become involved in a variety of learning tasks that help them develop mathematical skills, learn how to communicate mathematically, and become mathematical problem solvers.

When completing the assignments, students should work carefully and neatly. Students should do the activities in the Assignment Booklets **independently**. This will ensure that the teacher acquires a more accurate picture of the student's ability and understanding.

If the student is having difficulties, he or she should review the appropriate sections in the Student Module Booklet. The home instructor can assist the student by reviewing these sections with the student and encouraging him or her to explain, describe, or demonstrate (using manipulatives, drawings, and so on) his or her understanding of a particular concept or idea.

Assessment and Evaluation

A broad range of assessment tools will be used to gather information for the purpose of evaluating the student's knowledge and understanding of curriculum skills and concepts. It is important that the teacher learns how the student thinks about mathematics as well as what concepts and skills the student has mastered. Assignment Booklet questions, journal entries, performance assessments, observations by the home instructor, and student self-evaluation pages may all be used. As well, the teacher may also use a final test.

In order to give the student and home instructor feedback on the student's current level of achievement throughout the school year, the student's teacher may provide written comments and assign a grade at the end of each module. The mark for each module will be determined primarily by how well the student completes the assignments in the Assignment Booklets. However, other broad-based assessment techniques (journal entries, performance assessments, and so on) may also be used.

5

Day 1: Numbers



5

Journal Entry

Explain how numbers are important in your life. Where do you see numbers? When do you use numbers? What do numbers help you to do?

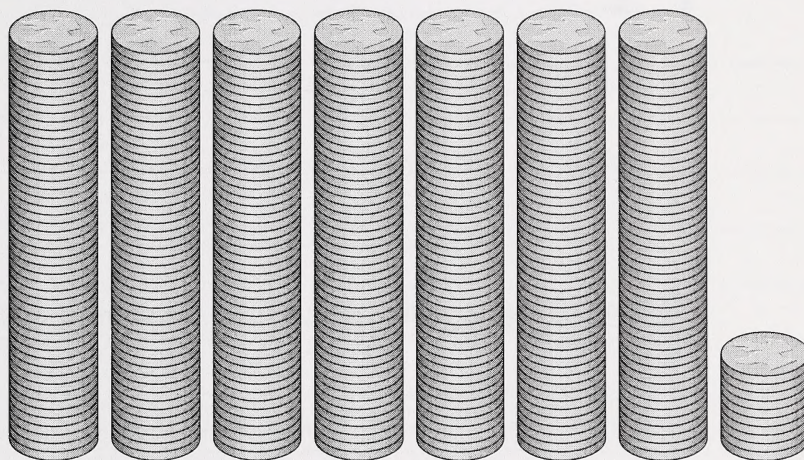
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18

Day 2: Estimating How Many

①

1. Estimate how many coins there are in the picture. Remember, to make a good estimate, you need to try to get as close as possible to the actual number without really counting all the objects.



I estimate that there are _____ coins in the picture.

②

2. What strategy did you use to estimate?

①

3. a. Count the actual number of coins.

Actual number of coins: _____ coins

②

- b. Compare the actual number of coins to your estimate. How close were you? Show your work.



4. Turn to page 35 of your textbook. Do questions 1 to 3 of **On Your Own**. Answer these questions in the spaces provided below.

On Your Own, Question 1: Estimate the number of squares shaded in each grid.

a. _____

b. _____

c. _____

d. _____

①

On Your Own, Question 2: Estimate the number of sheets in the larger pile.

②

On Your Own, Question 3: Between which pages do you think the bookmark is placed? Explain your thinking.



5.

Journal Entry

Describe the objects-in-a-jar activity. Explain what happened when you estimated first just by looking. Then explain what happened when you used the portion method. Tell why you think one of your estimates was better than the other.

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10

Day 3: Measuring and Estimation



5

1.

Journal Entry

Write about a time when you measured something by estimating. Was your estimate close or accurate? What everyday “problem” did it help you solve?

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- ⑤
2. Suppose you wanted to know how many pennies it would take to completely cover one page of this booklet. How would you go about **estimating** the total number of pennies needed? Explain your method.
- ---

Day 4: Modelling Numbers

Note to the Home Instructor

It is important that students learn how to read numbers aloud correctly. Listen as the student reads each of the modelled numbers on page 36 of the textbook. Note that the word “and” is **not** used when numbers are written in words or read aloud.

Example: 306 three hundred and six (incorrect)
 three hundred six (correct)



1. Turn to page 36 of your textbook. Do questions 1 to 3 of Visualizing Numbers.

Answer each question in the spaces provided. For each question

- estimate first
- count and write the number as a numeral
- write the number in words
- read the number aloud to your home instructor

3

Visualizing Numbers, Question 1:

- estimate: _____
- the number as a numeral: _____
- the number in words: _____

- Read the number to your home instructor.

3

Visualizing Numbers, Question 2:

- estimate: _____
- the number as a numeral: _____

- the number in words: _____

- Read the number to your home instructor.

③

Visualizing Numbers, Question 3:

- estimate: _____

- the number as a numeral: _____

- the number in words: _____

- Read the number to your home instructor.

2. Turn to page 37 of your textbook. Do questions 1 and 2 of On Your Own. Answer these questions in the spaces provided. **Note:** Use the shortcut method of drawing base ten blocks.

On Your Own, Question 1: Write four numbers between 250 and 850. Draw base ten blocks to show each. Then write each number in words.



⑫

First Number: _____

Base Ten Drawing:

Number in Words: _____

Second Number: _____

Base Ten Drawing:

Number in Words: _____

Third Number: _____

Base Ten Drawing:

Number in Words: _____

Fourth Number: _____

Base Ten Drawing:

Number in Words: _____

③

On Your Own, Question 2: Write a number that is less than 700, greater than 600, and has 0 tens. Draw base ten blocks to show your number. Then write your number in words.

Number: _____

Base Ten Drawing:

Number in Words: _____



3. Turn to page 37 of your textbook. Do questions 1 to 3 of Practise Your Skills. Answer the questions in the spaces provided below.

Practise Your Skills, Question 1: Fill in the blanks.

- ④
- a. $936 =$ _____ hundreds _____ tens _____ ones
- b. $702 =$ _____ hundreds _____ tens _____ ones
- c. $569 =$ _____ hundreds _____ tens _____ ones
- d. $350 =$ _____ hundreds _____ tens _____ ones

④ **Practise Your Skills, Question 2:** Write the numeral for each.

- a. four hundred sixty b. four hundred sixty-eight

- c. four hundred eight d. four hundred eighty

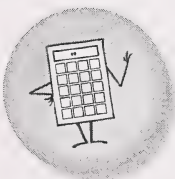
④ **Practise Your Skills, Question 3:** Write each number in words.

a. 620 _____

b. 765 _____

c. 341 _____

d. 209 _____



4. Use a calculator to find each number. Write the numeral for each.

a. six hundred less than nine hundred sixteen _____

b. one hundred seventy greater than two hundred twenty-six _____

c. thirty less than three hundred forty-three _____

d. twenty-five greater than four hundred fifty _____



Journal Entry

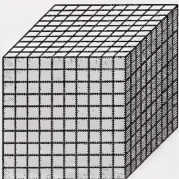
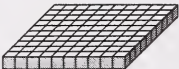


Do you think base ten blocks would be useful if you were trying to explain place value to a younger student? Explain.

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39


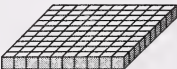
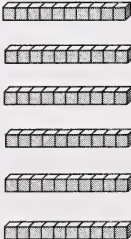

Day 5: Modelling Larger Numbers

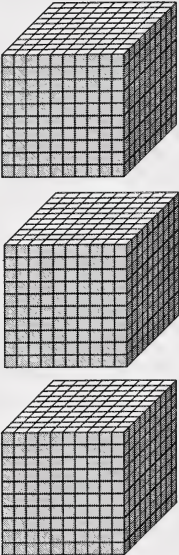
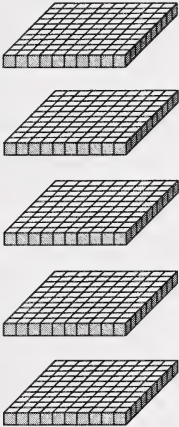


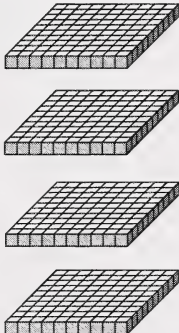

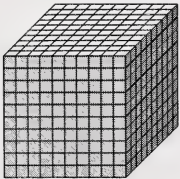


- 4 1. Look at these four pieces from a base ten blocks set. Name each one.
Hint: The first letter of each piece is given as a clue.

			
t _____	h _____	t _____	u _____
c _____	f _____	r _____	c _____

- 3 2. a. How many units make a rod? _____
b. How many rods make a flat? _____
c. How many flats make a thousands cube? _____

- 5 3. Groups of base ten blocks can stand for numbers. Tell what number is represented in each row. Give your answer in the last column.

	Thousands Cubes	Hundreds Flats	Ten Rods	Unit Cubes	Number
a.					
b.					

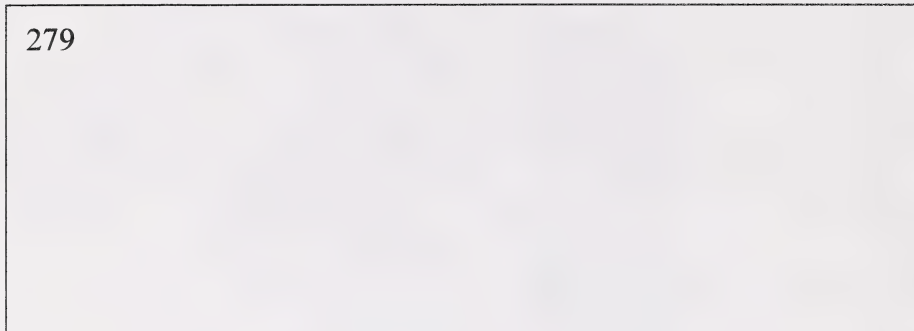
	Thousands Cubes	Hundreds Flats	Ten Rods	Unit Cubes	Number
c.					
d.					
e.					

4. For each of the following, draw a diagram that shows the number. Use base ten unit cubes, tens rods, hundreds flats, and thousands cubes in your diagrams. Use the shortcut method of drawing.

①

a.

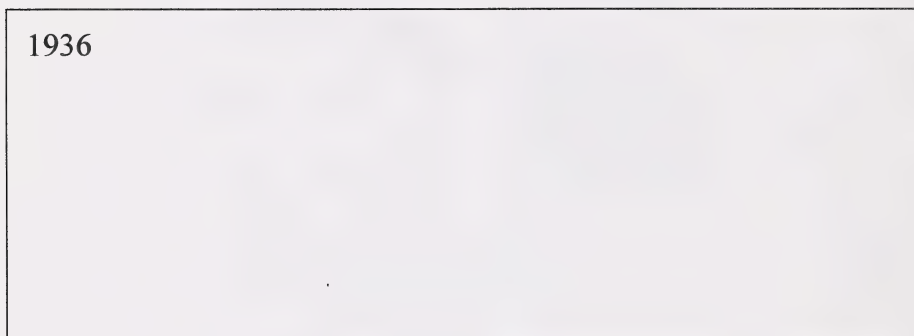
279



②

b.

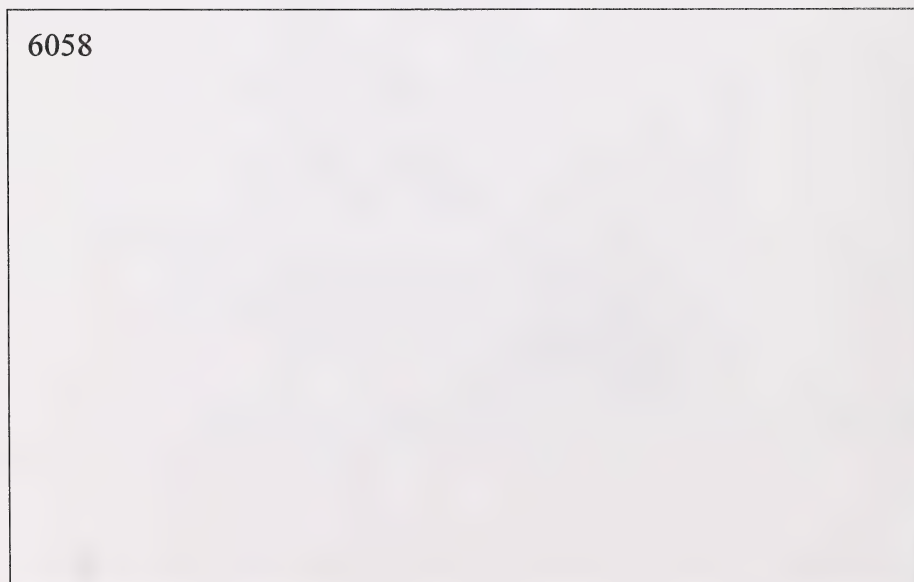
1936



②

c.

6058



③

5. a. Wei's teacher asked her to build a model to show 2368. Wei has these base ten blocks on her desk:

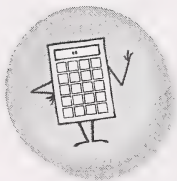
- 2 large cubes
- 4 flats
- 25 small cubes

Can Wei build the model using the blocks on her desk? Use diagrams and numbers to explain your answer.

3. b. Theo has the following base ten blocks on his desk:

- 2 large cubes
- 8 flats
- 24 rods

Can Theo build a model to show 3000 using the blocks on his desk?
Explain your answer using diagrams and numbers.



6. Use mental math or a calculator to find each number. Write the numeral for each.

a. 220 greater than 8400 _____

b. 1100 less than 5300 _____

c. 150 greater than 1600 _____

d. 410 less than 2560 _____

④

7. Write each of the following in expanded form.

Example: $7631 = 7000 + 600 + 30 + 1$ a. $2537 =$ _____b. $5609 =$ _____c. $6093 =$ _____d. $4500 =$ _____

④

8. Fill in the blanks.

a. $4360 =$ _____ thousands _____ hundreds _____ tens _____ onesb. $7471 =$ _____ thousands _____ hundreds _____ tens _____ onesc. $8068 =$ _____ thousands _____ hundreds _____ tens _____ onesd. $6005 =$ _____ thousands _____ hundreds _____ tens _____ ones

④

9. Write each number in words.

a. 216 _____

b. 960 _____

c. 648 _____

d. 799 _____

39

Day 6: Place Value—Whole Numbers



1. Turn to page 41 of your textbook. Do questions 1 to 3 of On Your Own. Answer these questions in the spaces provided.

On Your Own, Question 1: How many different ways can you show 53¢ using dimes and pennies? Show as many ways as you can.

3

⑤

On Your Own, Question 2: How many different ways can you show \$1.25 using loonies, dimes, and pennies? Show as many ways as you can.

Hint: Use a chart.

On Your Own, Question 3:

- ③ a. How many bills are needed to buy a horse for \$2000 using only 100-dollar bills? Explain how you arrived at your answer.

- ③ b. How many bills are needed if you use only 10-dollar bills to pay for the horse? Explain how you arrived at your answer.

- ③ 2. Use the following place-value chart to show 6732 in **three** different ways. An example has been done for you.

	Thousands	Hundreds	Tens	Ones
	6	7	3	2
Example	6	6	13	2
a.				
b.				
c.				

- ⑤ 3. Write each of the following numbers as a numeral. Ask your home instructor for help reading these numbers if you need to.

- a. two thousand five hundred one _____
- b. six thousand eighty _____
- c. five thousand three _____
- d. two thousand three hundred fourteen _____
- e. six thousand seven _____

- ④ 4. Write each of these numerals in expanded form.

Example: $9861 = 9000 + 800 + 60 + 1$

- a. $3921 =$ _____
- b. $6905 =$ _____
- c. $7818 =$ _____
- d. $4004 =$ _____



5. Turn to page 41 of your textbook. Do questions 1 and 2 of Practise Your Skills. Answer these questions in the spaces provided.

Practise Your Skills, Question 1: Write each number shown by the base ten blocks using numerals and words.

4

a. _____

b. _____

4

Practise Your Skills, Question 2: Complete each line.

2485 = 2 thousands 4 hundreds _____ tens _____ ones

2485 = 2 thousands 4 hundreds 7 tens _____ ones

2485 = 2 thousands 4 hundreds 6 tens _____ ones

2485 = 2 thousands 3 hundreds _____ tens _____ ones



6.

Journal Entry

⑤

The base ten block for 10 000 is called a **ten-thousands rod**. It is made up of 10 thousands cubes placed end to end in a row. When you look at it, you are seeing 10 000 unit cubes.

Where else have you seen 10 000 of something? Have you ever been to a concert or sports event where there were 10 000 people present? Have you ever seen \$10 000?

For your Journal Entry, give some examples of times when you have seen 10 000 of something. Describe what you saw. Tell how much space was taken up. Were the 10 000 “things” big or small? Why did you think you were seeing 10 000?

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39

Day 7: Comparing Whole Numbers



1. Find the ten number cards for Day 7. Pick out any four number cards and list them here:

①

- a. Use the four cards to form the least (or smallest) possible four-digit number.

①

- b. Use the four cards to form the greatest possible four-digit number.

⑤

- c. Use the four cards to make **five** more four-digit numbers. List them in order from least to greatest.

least

greatest

⑧

2. Rewrite each set of numbers in order from least to greatest.

- a. 9942, 9924, 9429

least

greatest

- b. 5884, 5858, 5548

least

greatest

- c. 1261, 1216, 1612, 1126

least

greatest

- d. 7272, 7727, 7722, 7227

least

greatest

3. Use the numbers in the box to answer questions 3.a. and 3.b.

258, 825, 528, 285, 582, 852

- ② a. List all the numbers greater than 287.

- ② b. List all the numbers less than 577.

- ② 4. If you are given two four-digit numbers, how do you decide which number is greater than the other?

- ④ 5. What is the value of 4 in each numeral? (Write 4, 40, 400, 4000, or 40 000 as your answer.)

a. 7485 _____

b. 4256 _____

c. 5243 _____

d. 7264 _____



8.

Journal Entry

Talk about The Place-Value Game. Tell what you enjoyed about playing this game. Explain the strategy you used in trying to win.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no text or other markings on the paper.

29

Day 8: Rounding Whole Numbers



1. Turn to page 35 of your textbook. Do questions 1 to 3 of Practise Your Skills. Answer the questions in the spaces provided.

Practise Your Skills, Question 1:

345, 293, 534, 750, 545, 554, 378

④

Which of these numbers is closest to each of the following?

a. 300 _____

b. 400 _____

c. 500 _____

d. 600 _____

④

Practise Your Skills, Question 2: Round each number to the nearest 10.

a. 74 _____

b. 629 _____

c. 843 _____

d. 709 _____

④

Practise Your Skills, Question 3: Which of the three amounts do you estimate to be closest to your own age? Explain how you could use **rounding** to arrive at your answer.

⑥

2. Round each number to the nearest **hundred**.

a. 9643 _____

b. 1995 _____

c. 2829 _____

d. 6333 _____

e. 7070 _____

f. 4892 _____

⑥

3. Round each number to the nearest **thousand**.

a. 9643 _____

b. 1995 _____

c. 2829 _____

d. 6333 _____

e. 7070 _____

f. 4892 _____

⑤

4. Use **words** to write the number for each of the following.

a. 253 rounded to the nearest ten

b. 777 rounded to the nearest ten

c. 777 rounded to the nearest hundred

d. 109 rounded to the nearest ten

e. 495 rounded to the nearest hundred

Day 9: Putting It All Together (I)

70

Part 1: Reviewing the Concepts

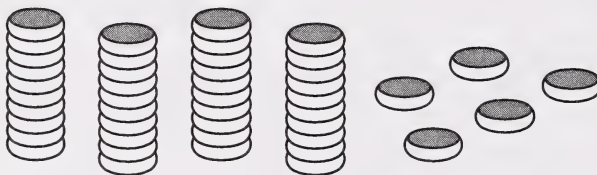
Use what you know about number concepts to complete the following exercises. Look back in the Student Module Booklet if you need to review any of the concepts you have learned. You are to complete **all** of the questions in Part 1.

Showing Numbers in Different Ways

1. Use numerals to write each number.

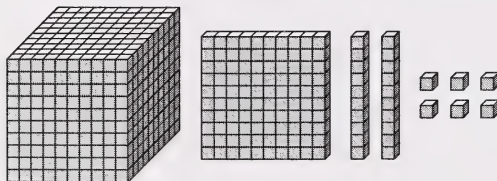
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a.



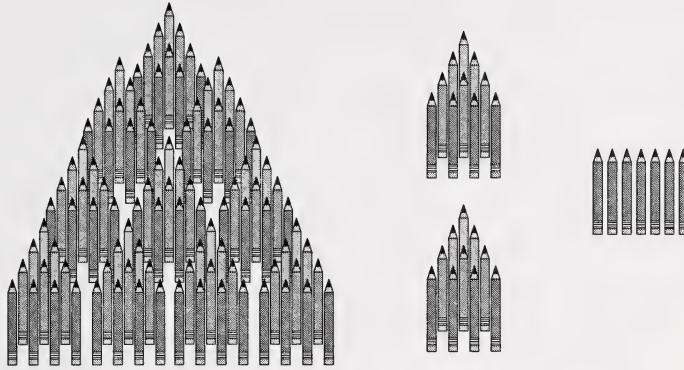
1

b.



①

c.



⑥

2. Use numerals to write the standard form of each of the following.

a. $4000 + 500 + 30 + 5$ _____

b. $7000 + 300 + 1$ _____

c. 1 thousand + 9 hundreds + 8 tens + 8 ones _____

d. 5 thousands + 8 hundreds + 3 tens + 7 ones _____

e. four thousand six hundred fifteen _____

f. nine thousand nine _____

③

3. Write each number in expanded form.

a. $1468 =$ _____

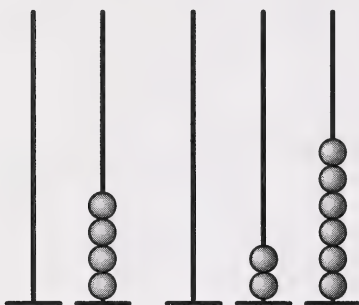
b. $10\,521 =$ _____

c. $2043 =$ _____

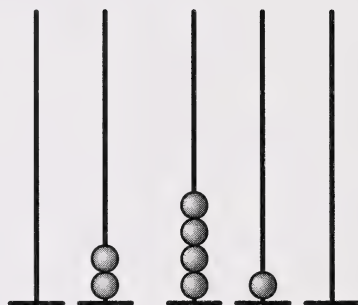
④

4. Write each number in standard form.

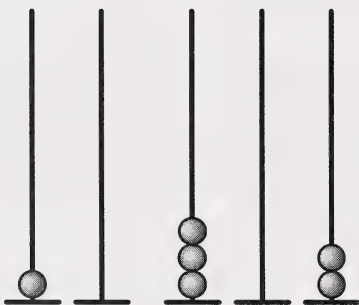
a.



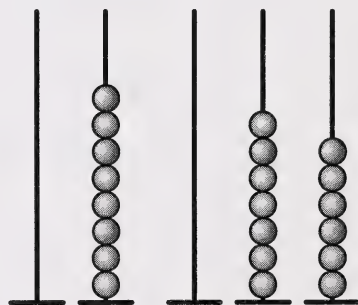
b.

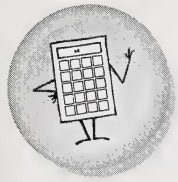


c.



d.





④

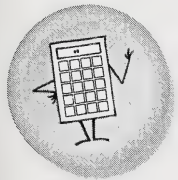
5. Find each number. Use mental math or a calculator. Write your answer using numerals.

a. 42 less than 282 _____

b. 1200 greater than 400 _____

c. 350 greater than 605 _____

d. 5000 greater than 2761 _____



④

6. Find the following numbers. Use a calculator if you wish. Write your answers using **words** instead of numerals.

a. 60 less than 379

b. 400 greater than 257

c. 180 greater than 810

d. 250 less than 780

Place Value

③

7. What is the value of 2 in each number?

Example: 5283 200

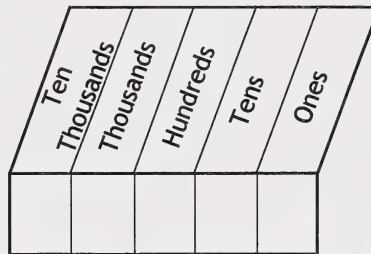
a. 5923 _____

b. 3672 _____

c. 2057 _____

②

8. Write ten thousand seventeen in the place-value chart.



④

9. Show 8630 in **four** other ways using thousands, hundreds, and tens.

Thousands	Hundreds	Tens	Ones
8	6	3	0
			0
			0
			0
			0

Comparing Whole Numbers

⑤

10. Insert $>$, $<$, or $=$ to make each statement true.

a. 4172 _____ 4712

b. 3519 _____ 3915

c. 5756 _____ 5756

d. 6235 _____ 6325

e. 8618 _____ 6816

⑧

11. Put each group of numbers in order from **least** to **greatest**.

Example:

7117	7017	(least)
7100	7071	↑
7017	7100	↓
7071	7117	(greatest)

a. 4369 _____

b. 5066 _____

4693 _____

6056 _____

4639 _____

5606 _____

5006 _____

c. 8649 _____

d. 7894 _____

8694 _____

7948 _____

6849 _____

7489 _____

6494 _____

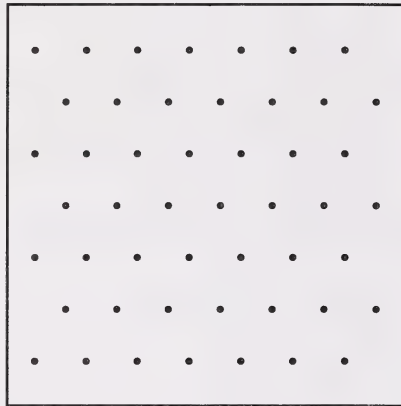
4798 _____

8946 _____

7849 _____

Estimating

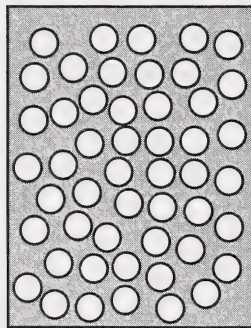
③

12. a. Estimate the number of holes in this ceiling tile.

Estimate _____

b. Explain your strategy.

③

13. a. Estimate the number of circles.

Estimate _____

b. Explain your strategy.

Rounding

⑨

14. Complete the following table by filling in the missing numbers. One has been done for you.

Number	Rounded to the Nearest Ten	Rounded to the Nearest Hundred	Rounded to the Nearest Thousand
536	540	500	1000
7668			
1088			
7634			
899			
8442			
9829			

15. Add up each money amount shown. Give the total. Then round the amount to the nearest ten dollars and the nearest hundred dollars.

③

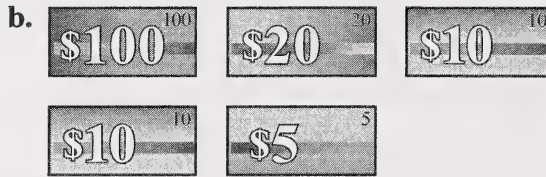
a.

 total

 nearest ten

 nearest hundred

3

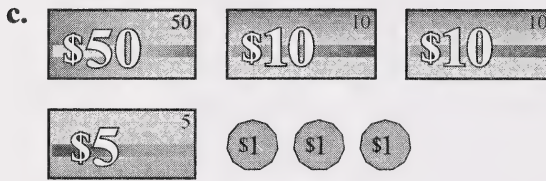


total

nearest ten

nearest hundred

3



total

nearest ten

nearest hundred

10

Part 2: Challenge Activities

Choose **either** Activity A **or** Activity B, **or** you may do both if you wish.

Activity A: How Many Names Are in the Phone Book?

1. Find the phone book for your area.

2

Open the phone book to a page that has telephone listings. How would you estimate how many names are on a page without counting each name?

One method you could try is to first estimate how many names are in a column. To do this, first divide a column into four equal portions. Then count the names in one portion and multiply by four. This will give you the approximate number of names in a column.

- ① 2. a. What is your estimate for the number of names in a column? _____
- ② b. How could you use this information to find the number of names on a page?

3. a. Once you know the number of names on a page, use your calculator to find the total number of names on all of the pages. Enter the numbers you are using on the blanks.

Number of Names in a Column	×	Number of Columns	×	Number of Pages of Names	=	Number of Names in the Book
-----------------------------------	---	-------------------------	---	--------------------------------	---	-----------------------------------

_____ × _____ × _____ = _____

- ① b. About how many names are in the phone book you have? Write your answer to the problem in a complete sentence.

Activity B: Reading and Interpreting a Chart

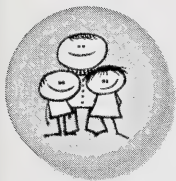
Turn to page 48 of your textbook. Do questions 2.a. to 2.e. from On Your Own. This activity involves reading and interpreting an air distance chart. Answer the questions in the spaces provided.

On Your Own, Question 2: Use the data from the table on page 48 to answer questions 2.a. to 2.e.

- ② a. What is the distance between Montreal and Vancouver?

- ② **b.** What is the least distance in the table?
- _____
- ② **c.** Which two cities listed are farthest apart?
- _____
- ② **d.** Which city is farthest from Saskatoon?
- _____
- ② **e.** Draw a line and mark the position of each of the six cities. (**Hint:** Start with Vancouver at the far left and end with Halifax at the far right.)

Day 10: Assessing What You Know (I)



Home Instructor's Assessment Page for Day 10

Directions to the Home Instructor

Remove this sheet from the Assignment Booklet. Use the Checklist and Comments sections to help evaluate the student's work. When the Day 10 activities have been completed, firmly attach this sheet to Assignment Booklet 2A.

Student's Name _____

Home Instructor _____ Date _____

Indicate in the Checklist and Comments sections what you observe and hear as the student works through the assessment task. Encourage the student to “think out loud” as he or she works. As you observe, you may wish to use questions or prompts like the following to help in determining the student's level of understanding.

- How do you know this shows 2640?
- Why did you decide to do it that way?
- Could you explain how you found that?
- What other way is there to show 2640?
- Why do you think you've found all the possible combinations (question 2)?

Checklist

- A.** The student can clearly show the number 2640 in at least three different ways (words, expanded form, base ten drawings, and so on). (question 1) ☐ Yes ☐ Not yet
- B.** The student can explain the value of the digits by referring to place value (for example, knows the value of 6 in 3600 is 600). (questions 1 and 2) ☐ Yes ☐ Not yet
- C.** The student can use the place-value chart to make up different combinations of thousands, hundreds, and tens that equal 2640. (question 2) ☐ Yes ☐ Not yet
- D.** The student can explain his or her method for finding different combinations. (question 2) ☐ Yes ☐ Not yet

Comments

Add any comments you have regarding the student's performance on the assessment task or any other information about the student's knowledge of this module that you would like to share with the teacher.

Day 10: Assessing What You Know (I)

Student's Assessment Page for Day 10

Student's Name _____

Part 1: Showing What You Can Do

Note: You may use any manipulatives or cut-out learning aids available to help solve the following problems.

1. Show (or represent) 2640 in as many ways as you can. (Use words, expanded form, base ten drawings, and so on.)

10



5

10

Part 2: Basic Number Facts

This section is made up of two timed tests. Ask your home instructor to time you as you do each test. Wait for your home instructor to tell you when to begin. **Do not mark these tests. They will be marked by your teacher.**

1. Addition Number Facts

Timed Test: 2 minutes

5

$$\begin{array}{r} 8 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 7 \\ \hline \end{array}$$

$9 + 4 =$

$6 + 9 =$

$9 + 3 =$

$4 + 9 =$

$8 + 6 =$

$$\begin{array}{r} 6 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ + 7 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 9 \\ \hline \end{array}$$

$6 + 7 =$

$8 + 9 =$

$8 + 8 =$

$9 + 6 =$

$5 + 7 =$

$$\begin{array}{r} 5 \\ + 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ + 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 8 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ + 5 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ + 6 \\ \hline \end{array}$$



If you finish before the two minutes are up, check your answers. Wait for your home instructor to tell you when to begin the next test.

⑤

2. Subtraction Number Facts

Timed Test: 2 minutes

$$\begin{array}{r} 11 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 4 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline \end{array}$$

$15 - 9 =$

$13 - 6 =$

$18 - 9 =$

$14 - 8 =$

$16 - 8 =$

$$\begin{array}{r} 15 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 11 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 6 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 6 \\ \hline \end{array}$$

$14 - 7 =$

$12 - 5 =$

$14 - 9 =$

$13 - 8 =$

$17 - 9 =$

$$\begin{array}{r} 13 \\ - 7 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ - 9 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ - 8 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ - 5 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ - 5 \\ \hline \end{array}$$



If you finish before the two minutes are up, check your answers.

Part 3: Thinking About What You Know

Part 3 is a chance for you to assess your own knowledge and abilities in mathematics. Take a few minutes before you begin writing to look back through Days 1 to 9 in your Student Module Booklet. On what days did you learn new things? Was there anything you found difficult or hard to understand? What things did you enjoy? What things would you like to know more about?

Now, using complete sentences, finish the following paragraph starters. You may wish to talk over your ideas with your home instructor before you begin writing.

1. I think Section 1: Number Concepts is mainly about _____

2. Some things I learned in Section 1 of this module are _____

3. One thing I like about Section 1 is _____

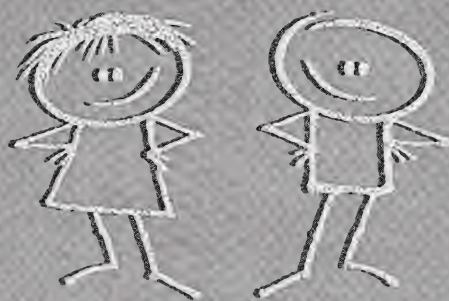
4. Something I don't really understand is _____

5. Something I would like to learn more about is _____

6. Something else I'd like to say is _____

Mathematics 4

Module 2 Number Concepts and Patterns



Assignment Booklet 2B



Learning
Technologies
Branch

Alberta
LEARNING

FOR TEACHER'S USE ONLY

Summary

	Total Possible Marks	Your Mark
Day 11	36	
Day 12	33	
Day 13	38	
Day 14	36	
Day 15	10	
Day 16	36	
Day 17	(1) 54	
	(2) 10	
Day 18	(1) 10	
	(2) 10	
	273	

Teacher's Comments

This document is intended for

Students	✓
Teachers	✓
Administrators	
Home Instructors	✓
General Public	
Other	

Mathematics 4
Module 2: Number Concepts and Patterns
Assignment Booklet 2B
Learning Technologies Branch
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ASSIGNMENT BOOKLET 2B

MATHEMATICS 4 – MODULE 2: NUMBER CONCEPTS AND PATTERNS

Notes to the Home Instructor

Learning Tasks

The nine mathematics modules and the accompanying Assignment Booklets have been developed so that students become involved in a variety of learning tasks that help them develop mathematical skills, learn how to communicate mathematically, and become mathematical problem solvers.

When completing the assignments, students should work carefully and neatly. Students should do the activities in the Assignment Booklets **independently**. This will ensure that the teacher acquires a more accurate picture of the student's ability and understanding.

If the student is having difficulties, he or she should review the appropriate sections in the Student Module Booklet. The home instructor can assist the student by reviewing these sections with the student and encouraging him or her to explain, describe, or demonstrate (using manipulatives, drawings, and so on) his or her understanding of a particular concept or idea.

Assessment and Evaluation

A broad range of assessment tools will be used to gather information for the purpose of evaluating the student's knowledge and understanding of curriculum skills and concepts. It is important that the teacher learns how the student thinks about mathematics as well as what concepts and skills the student has mastered. Assignment Booklet questions, journal entries, performance assessments, observations by the home instructor, and student self-evaluation pages may all be used. As well, the teacher may also use a final test.

In order to give the student and home instructor feedback on the student's current level of achievement throughout the school year, the student's teacher may provide written comments and assign a grade at the end of each module. The mark for each module will be determined primarily by how well the student completes the assignments in the Assignment Booklets. However, other broad-based assessment techniques (journal entries, performance assessments, and so on) may also be used.

36

Day 11: Patterns



1. Turn to page 228 of your textbook. Do questions 1 to 3 of Describing Patterns. Use the square and triangle cutouts for Day 11 (from the Appendix of the Student Module Booklet) to build models of the castle walls for each question. Complete the T-tables for each question. Answer these questions in the spaces provided.

4

Describing Patterns, Question 1: How many pieces do you need to build a castle wall with 6 towers?

Number of Towers	Number of Pieces
1	3
2	8
3	13
4	
5	
6	

You need _____ pieces for a wall with 6 towers.

4

Describing Patterns, Question 2: How many pieces do you need to build a 5-tower wall?

Number of Towers	Number of Pieces
1	2
2	5
3	8
4	
5	
6	

You need _____ pieces for a 5-tower wall.

④

Describing Patterns, Question 3: How many towers are in a 36-piece wall?

Number of Towers	Number of Pieces
1	4
2	12
3	20
4	
5	
6	

There are _____ towers in a 36-piece wall.

2. Turn to page 229 of your textbook. Do questions 1 and 2 of Practise Your Skills. Answer these questions in the spaces provided.

Practise Your Skills, Question 1: Show the next three terms in each pattern.

③

a. 4, 7, 10, _____, _____, _____

③

b. 13, 24, 35, _____, _____, _____

③

c. 99, 87, 75, _____, _____, _____

③

d. \therefore \vdots \vdots

_____, _____, _____

Practise Your Skills, Question 2:

③

a. Complete the T-table.

Number of Hours	Money Earned
1	\$6
2	\$12
3	\$18
4	
5	
6	

④

b. How much would be earned in

• 10 hours? _____

• 15 hours? _____



3.

Journal Entry

Explain how you think writing numbers in a T-table helps you to see patterns.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

33

Day 12: Skip Counting

20

1. Fill in the missing numbers for each skip-counting pattern.

a. 0, 3, 6, 9, _____, _____, _____, _____

b. 52, 55, _____, 61, _____, _____, _____, 73

c. 50, 45, _____, _____, _____, _____, 20

d. 85, _____, 95, _____, _____, _____, 115

e. 0, 9, 18, 27, _____, _____, _____, _____

f. 0, 6, _____, 18, _____, 30, _____, _____

g. 0, 4, 8, _____, _____, _____, 24, _____

h. 48, 52, 56, _____, _____, _____, _____, 76

i. 0, 7, 14, _____, _____, _____, _____, 49

j. 64, 56, 48, _____, _____, 24, 16, _____, _____

2. Starting at 0, colour in each number counted as you skip count

④

a. by 6s

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99

④

b. by 7s

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29
30	31	32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47	48	49
50	51	52	53	54	55	56	57	58	59
60	61	62	63	64	65	66	67	68	69
70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89
90	91	92	93	94	95	96	97	98	99



3.

Journal Entry

Look back at the patterns you created in the number charts in Day 12 of the Student Module Booklet. Were you surprised by any of the patterns? Tell what you noticed or found interesting.

Do you think that knowing skip-counting patterns might be useful in learning the multiplication and division number facts? Explain your thinking.

[illegible]

38

Day 13: Discovering Patterns Using T-Tables

1. Turn to page 233 of your textbook. Do questions 1 and 2 of On Your Own. Answer these questions in the spaces provided.

On Your Own, Question 1: Suppose you need to seat 22 people at square tables placed end-to-end to make one big table. Each table seats 1 person on a side. How many tables do you need? Explain your plan. (Use drawings or a T-table to help explain your answer.)

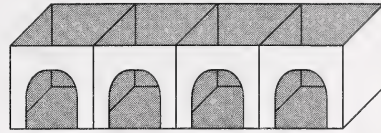
8

8

On Your Own, Question 2: Suppose you had 17 toothpicks to continue the triangle design on page 232. Your design left off at 6 triangles. How many triangles can you build? Explain your thinking. (Use drawings or a T-table to help explain your answer.)

8

2. Liam is helping his father build shelters for the dogs at their boarding kennel. The shelters are built in a long row, and each shelter shares a wall with the next shelter.



Number of walls 4 7 10 13

It takes 4 walls to make 1 shelter, 7 walls to make 2 shelters, 10 walls to make 3 shelters, and so on.

Construct a T-table using this information. Use the T-table to calculate how many walls are needed to build shelters for 9 dogs if the shelters are all connected.

Number of walls needed for 9

shelters: _____

Is there a quick way to calculate how many walls would be needed to build shelters like these for 20 dogs? Explain how.

3. Look at the following chain pattern of hexagons and triangles.



A design with 2 hexagons
forms 2 triangles.



A design with 3 hexagons
forms 4 triangles.



A design with 4 hexagons
forms 6 triangles.

②

- a. Draw the next shape in this pattern.

④

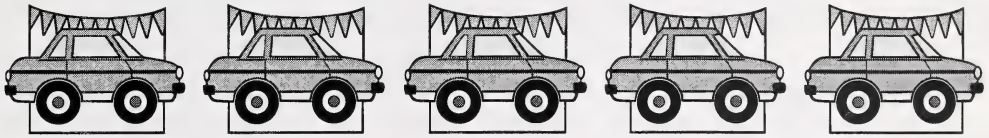
- b. Write the information for this chain pattern in a T-table.

②

- c. Use your T-table to find how many triangles there would be in a design with 9 hexagons.

_____ triangles

4. In a car-assembly plant, 5 tires are used for each car. (There are 4 tires on the car and 1 spare tire in the trunk.)



4

- a. Complete the T-table and give the “rule.”

Cars	Tires
1	5
2	10
3	15
4	
5	
8	

Rule: _____

4

- b. How many tires will be needed for 30 cars?

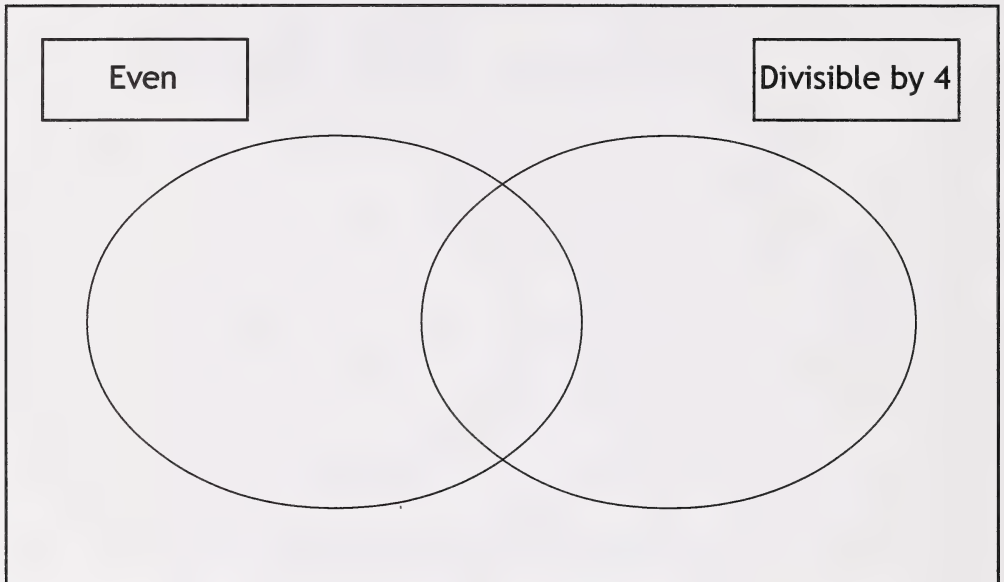
_____ tires will be needed for 30 cars.

36

Day 14: Finding Patterns in Data

1. a. Skip count by 2s up to 24. Write the numbers here.

- b. Sort the numbers you listed using a Venn diagram.



- c. Describe any patterns you can see in the way the numbers appear.

④ 2. a. Sort these numbers into the Carroll diagram below.

11	22	33	44	55
111	222	333	444	555
66	77	88	99	
666	777	888	999	

	Less Than 100	Greater Than 100
Odd		
Even		

② b. Describe any patterns you can see in the way the numbers appear.

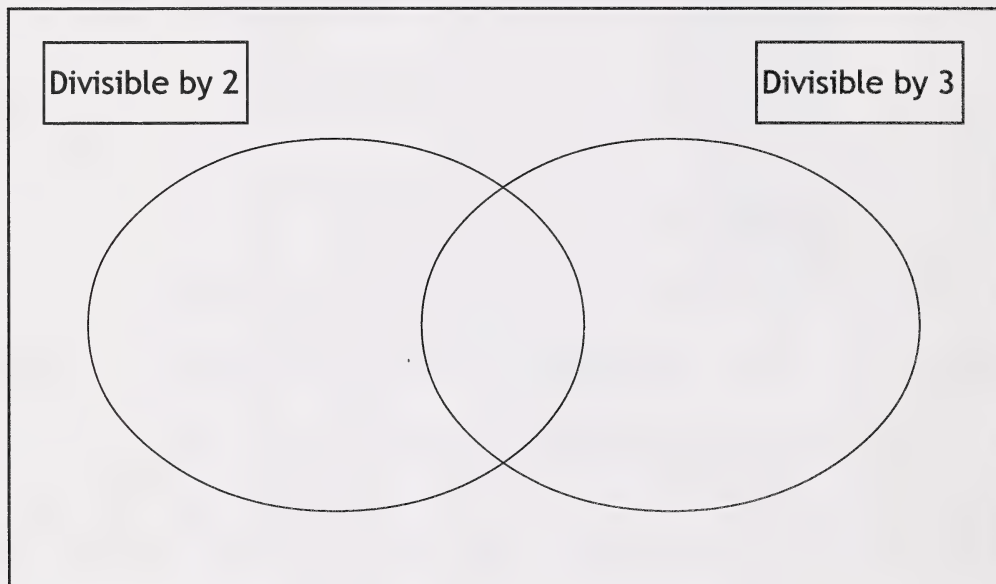
3. For the following question, use the set of numbers from 1 to 24. Use a Venn diagram to organize the data. Then describe any patterns you see.

①

- a. Write the numbers that you will use here.

④

- b. Sort the numbers from question 2.a. into the correct sections of the following Venn diagram.



②

- c. Describe any patterns you can see in the way the numbers appear in the Venn diagram.

②

- d.** If you included the number 27 in the numbers to be sorted, would you put it in the left circle, the right circle, the overlapping section, or at the bottom? Tell why.

②

- e.** Where would you put the number 36? Tell why.

①

- 4. a. Multiply each number in the top row by 2.**

[illegible]

b. Complete a Carroll diagram for each row of the table.

②

Top Row

	Less Than 7	7 or Greater
Odd		
Even		

②

Bottom Row

	Less Than 7	7 or Greater
Odd		
Even		

- ② c. What did you notice about the second Carroll diagram that was different from the first?

- ③ d. Multiply each number in the top row by 3.

	1	2	3	4	5	6	7	8	9	10	11	12
$\times 3$												

Are there any odd numbers to write in the top two boxes of the Carroll diagram? Explain.

- ② e. If you multiply each number (from 1 to 12) by 4, how many odd numbers would be written in the top boxes of the Carroll diagram?

10

Day 15: Using Patterns to Prove a Theory



Journal Entry

Write a paragraph that would convince someone else that one of your theories about adding odd or even numbers is correct. Do the following in your paragraph:

- Explain your theory.
- Tell what you did to prove your theory.
- Give some examples.

Here are some words you can use to help you “connect” one sentence to the next:

- first
- second
- to begin with
- then
- finally
- next
- last

[illegible]

36

Day 16: Problem Solving

1. Solve problems a. to f. using the Guess-and-Check strategy. Show any calculation you do to get your answer. Then write your answer in a complete sentence. **Remember:** Before you make your first guess, **think** first so that you make a reasonable guess. For example, in question 1.a., guessing that each coin is a loonie (a 1-dollar coin) would not be a reasonable guess.

4

- a. Jamir has four coins in his pocket. Together they are worth 80¢. What coins does Jamir have?



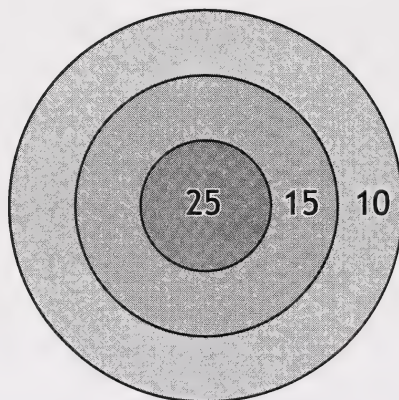
4

- b. Suzanne has seven coins in her pocket. Together they are worth \$1.80. What coins does Suzanne have?



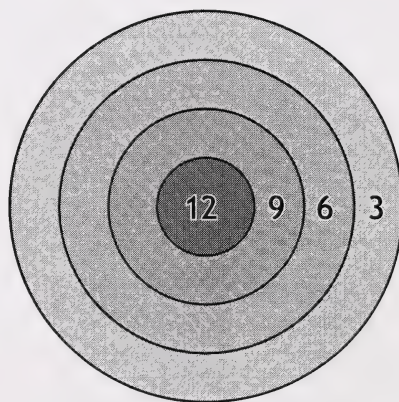
④

- c. Mark scored 45 points by throwing 3 darts at this dartboard. Where could his darts have landed? (All 3 darts hit the dartboard.)

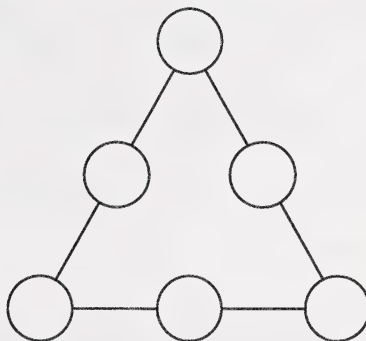


⑧

- d. Melanie shot 3 arrows at the target shown. All of the arrows landed on the target. Where could her arrows have landed if she scored 21 points? Can you find more than one solution?



- ⑥ e. Put the numbers 2, 3, 4, 5, 6, and 7 in the circles of the diagram so that the sum of each row of three circles equals 12.



- ⑤ f. Ramon and his brother, Chad, share a paper route. Every day they deliver 174 newspapers. Ramon delivers 22 more papers than Chad. How many papers does each boy deliver?



2.

Journal Entry

Write an explanation about how you solved the Triangle Sums problem in Day 16. Pretend you are trying to teach someone how to use the Guess-and-Check strategy. Explain how you used this strategy to decide in which of the circles to place each of the six numbers.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Day 17: Putting It All Together (II)

Part 1: Reviewing the Concepts

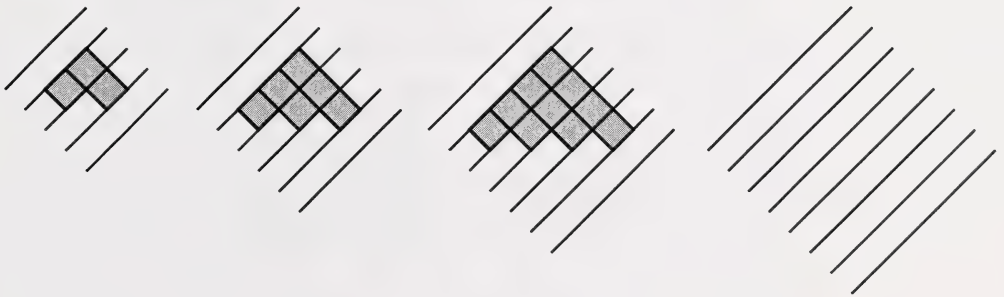
Use what you know about patterns to complete the following exercises. Look back in the Student Module Booklet if you need to review any of the concepts you have learned. You are to complete **all** of the questions in Part 1.

Exploring Patterns

- Here are some patterns created by using shapes. Draw the next diagram in each pattern.

2

a.



2

b. 

②



②

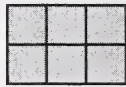


③

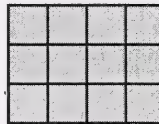
2. Continue the following pattern. Write the matching number that shows how many squares are formed.



2



6



12

- ③ 3. Find a pattern in the diagram. Then fill in the empty squares using this pattern.

A	B	C	A	B
B	C	A		
C	A			

Discovering T-Table Patterns

4. Study each of the following T-tables to discover the pattern. Complete each table. Then write the rule that describes the pattern.

Example

1st Number	2nd Number
2	7
3	8
7	12
10	15
13	18
18	23

Rule: Add 5 to the first number.

④

a.

1st Number	2nd Number
4	24
5	30
2	12
1	
3	
6	

Rule: _____

④

b.

Number of Cars	Number of Wheels
2	8
3	12
5	20
9	
11	
20	

Rule: _____

④

c.

1st Number	2nd Number
9	2
11	4
13	6
7	
15	
27	

Rule: _____

④

d.

Number of Aliens	Number of Eyes
1	5
3	15
9	
11	
25	

Rule: _____

④

e.

1st Number	2nd Number
48	24
10	5
22	
12	
36	

Rule: _____

Skip Counting

⑫

5. Fill in the missing numbers for each skip-counting pattern.

a. 9, 11, 13, _____, _____, _____, _____

b. 8, 12, 16, _____, _____, 28, _____, _____

c. 0, 6, _____, _____, _____, 30, _____, 42

d. 645, 635, _____, _____, _____, _____, 585

e. 994, 996, 998, _____, _____, _____, _____

f. 50, 75, _____, 125, _____, _____, _____, 225

Using T-Tables

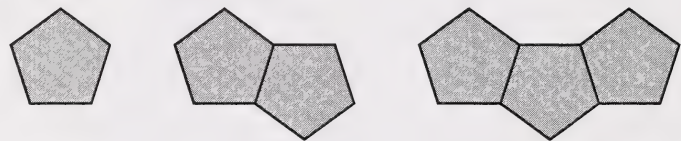
6. A pentagon is a special five-sided shape.



Look at the following chain pattern. It is made with tables shaped like pentagons. When 1 table is used alone, 5 guests can sit at the table. When 2 tables are placed side-by-side, 8 guests can sit at the table.

5

a. Use the chain-pattern drawing to complete the T-table. Calculate the number of guests that can sit at the table as it gets longer.



Number of Tables	Number of Guests
1	
2	
3	
4	
5	

3

b. How many tables will be needed for 26 guests? _____

10

Part 2: Challenge Activities

Choose **either** Activity A **or** Activity B, **or** you may do both if you wish.

Activity A: Patterns in Calendars

If you study the numbers on any calendar page, you should be able to see some interesting number patterns.

Look at this calendar page for the month of September.

September						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Step 1: Choose any square of four numbers from the calendar.

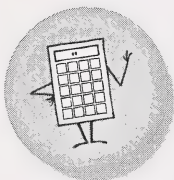
Example

10	11
17	18

Step 2: Add the numbers diagonally.

$$10 + 18 = ? \text{ and } 17 + 11 = ?$$

1. What do you notice?



Step 3: Use a calculator to multiply the numbers diagonally. Then subtract the smaller product from the larger product.

2. What number do you get when you subtract the products?

3. Repeat Steps 1, 2 and 3 **two** more times using a different square of four numbers from the calendar each time.

Step 1: Choose a square of four numbers.

Step 2: Add the numbers diagonally.

Step 3: Multiply the numbers diagonally and subtract the products.

Describe the patterns you have discovered.

Activity B: Palindromes

⑩

A **palindrome** is a word, phrase, or number that reads the same way both forwards and backwards. Some examples are show below.

Words	Phrases	Numbers
noon	too hot to hoot	44
dad	ten animals I slam in a net	393
wow		1881
radar		27 742

Numbers that are not palindromes can be changed into palindromes in this way:

Step 1: Choose a number.

68

Step 2: Reverse the digits.

86

Step 3: Add the two numbers together.

$$\begin{array}{r} 68 \\ + 86 \\ \hline 154 \end{array}$$

← Sometimes this total will be a palindrome. In this case, it is not, so you must continue on to Step 4.

Step 4: If no palindrome occurs in Step 3, continue reversing the digits and adding the two numbers together.

$$\begin{array}{r}
 68 \\
 + 86 \\
 \hline
 154 \\
 + 451 \\
 \hline
 605 \\
 + 506 \\
 \hline
 1111
 \end{array}
 \begin{array}{l}
 \leftarrow \text{This is the reverse of 154.} \\
 \leftarrow \text{This total is not a palindrome.} \\
 \leftarrow \text{This is the reverse of 605.} \\
 \leftarrow \text{This total is a palindrome.}
 \end{array}$$

A number that takes only one addition step to form its palindrome is called a one-step palindrome, a number that takes two addition steps is called a two-step palindrome, and so on. The number 68 is a three-step palindrome.

Example

$$\begin{array}{r}
 12 \\
 + 21 \\
 \hline
 33
 \end{array}
 \leftarrow \begin{array}{l}
 \text{This is a one-step palindrome.} \\
 \text{Only one addition step has been used.}
 \end{array}$$

Find the number of steps it takes to turn each number in the chart into a palindrome. Show your calculations on the blank page that follows. **Hint:** Circle the plus sign each time you add so you can easily count the number of addition steps.

Number	Its Palindrome	Number of Addition Steps
23	55	1
19		
43		
56		
69		
75		

Try turning other numbers between 1 and 100 into palindromes. **Hint:** Don't tackle 89 or 98 unless you've got lots of paper. Each number takes 24 steps!

Day 18: Assessing What You Know (II)



Home Instructor's Assessment Page for Day 18.

Directions to the Home Instructor

Remove this sheet from the Assignment Booklet. Use the Checklist and Comments sections to help evaluate the student's work. When the Day 18 activities have been completed, firmly attach this sheet to Assignment Booklet 2B.

Student's Name _____

Home Instructor _____ Date _____

Indicate in the Checklist and Comments sections what you observe and hear as the student works through the assessment task. Encourage the student to “think out loud” as he or she works. As you observe, you may wish to use questions or prompts like the following to help in determining the student's level of understanding.

- What pattern do you see in this drawing?
- How will you go about solving the problem?
- Why did you decide to do it that way?
- How many triangles will there be with 4 squares? How do you know?
- How many triangles will there be with 8 squares?
- Can you explain how you found that?



Note: The student may use any manipulatives or cut-out learning aids available to help solve the problem.

Checklist

- A. The student can identify the pattern in the drawing. ☐ Yes ☐ Not yet
- B. The student can clearly describe how the pattern grows. ☐ Yes ☐ Not yet
- C. The student is able to predict (using T-tables) or show (using drawings or cutouts) the correct number of triangles for 8 squares. ☐ Yes ☐ Not yet
- D. The student can describe clearly his/her method for solving the problem. ☐ Yes ☐ Not yet

Comments

Add any comments you have regarding the student's performance on the assessment task or any other information about the student's knowledge of this module that you would like to share with the teacher.

Day 18: Assessing What You Know (II)

Student's Assessment Page for Day 18

Student's Name _____

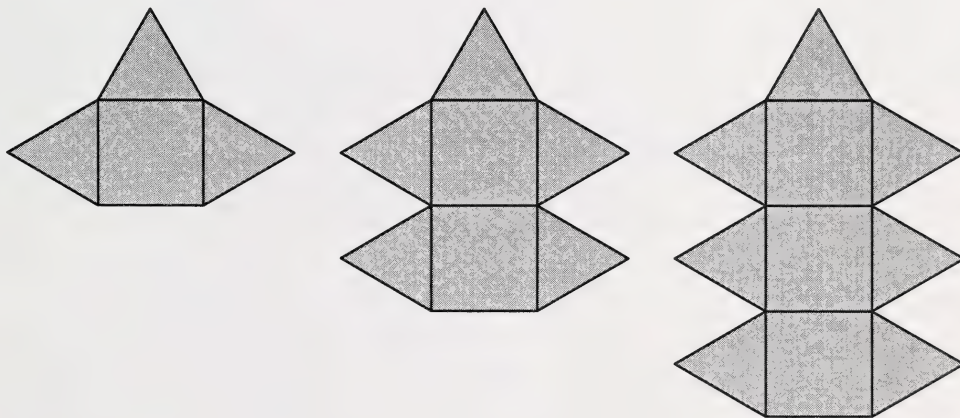
10

Part 1: Showing What You Can Do

Discovering Patterns

Note: You may use any manipulatives or cut-out learning aids available to help solve the following problem.

Look carefully at this drawing and identify the pattern.



If the pattern continues to grow to 8 squares, how many triangles would there be? Show how you would solve this problem. Be ready to explain your method to your home instructor.

Use the back of this page for your answer.

10

Part 2: Basic Number Facts

This section is made up of two timed tests. Ask your home instructor to time you as you do each test. Wait for your home instructor to tell you when to begin. **Do not mark these tests. They will be marked by your teacher.**

1. Multiplication Number Facts

Timed Test: 2 minutes

$6 \times 3 =$

$5 \times 4 =$

$5 \times 6 =$

$6 \times 6 =$

$6 \times 7 =$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$6 \times 8 =$

$7 \times 5 =$

$4 \times 9 =$

$6 \times 4 =$

$4 \times 5 =$

$$\begin{array}{r} 7 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 4 \\ \hline \end{array}$$

$5 \times 7 =$

$7 \times 7 =$

$5 \times 9 =$

$8 \times 5 =$

$4 \times 8 =$



If you finish before the two minutes are up, check your answers. Wait for your home instructor to tell you when to begin the next test.

⑤

2. Division Number Facts

Timed Test: 2 minutes

$30 \div 6 =$

$42 \div 6 =$

$48 \div 8 =$

$25 \div 5 =$

$20 \div 4 =$

$5 \overline{)45}$

$7 \overline{)21}$

$5 \overline{)30}$

$8 \overline{)40}$

$3 \overline{)24}$

$48 \div 6 =$

$36 \div 4 =$

$45 \div 9 =$

$35 \div 5 =$

$28 \div 4 =$

$6 \overline{)36}$

$4 \overline{)32}$

$9 \overline{)27}$

$7 \overline{)42}$

$5 \overline{)40}$

$24 \div 6 =$

$49 \div 7 =$

$35 \div 7 =$

$36 \div 9 =$

$21 \div 3 =$



If you finish before the two minutes are up, check your answers.

Part 3: Thinking About What You Know

Part 3 is a chance for you to assess your own knowledge and abilities in mathematics. Take a few minutes before you begin writing to look back through Days 11 to 17 in your Student Module Booklet. On what days did you learn new things? Was there anything you found difficult or hard to understand? What things did you enjoy? What things would you like to know more about?

Now, using complete sentences, finish the following paragraph starters. You may wish to talk over your ideas with your home instructor before you begin writing.

1. I think Section 2: Patterns is mainly about _____

2. Some things I learned in Section 2 of this module are _____

3. One thing I liked about Section 2 is _____

4. Something I don't really understand is _____

5. Something I would like to learn more about is _____

6. Something else I'd like to say is _____
